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PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN CONVEYOR BELTING

(71) We, BTR INDUSTRIES LIMITED, a British Company, of Silvertown House, Vincent Square, London, S.W.1., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to conveyors.

It is known for conveyor belts to be formed of endless loops of flexible material. These belts are normally supported between rollers spaced apart longitudinally of the belt and, when loaded, sag between those rollers. Such belts are normally flexible transversely so that troughs may be formed over the load carrying section.

It has been proposed in such belts to provide steel cords as the longitudinal reinforcing members.

It has been proposed to form a passenger conveyor by stiffening the belt transversely by means of two layers of transverse metal cords spaced apart one layer on either side of a layer of longitudinal reinforcing cords whereby to provide a beam effect across the belt. Such a belt is supported on two continuous sets of rollers one on each side of the belt to prevent any sagging in the longitudinal direction. Sagging in the transverse direction is prevented by the "beam" effect.

It is an object of the invention to provide an alternative and improved conveyor which is suitable for the conveying of passengers.

The invention provides a conveyor consisting of an endless loop of conveyor belting, said loop consisting of a carcass of flexible resilient elastomeric or plastics material having embedded therein a layer of longitudinally extending metal wires or cords and on each face of the carcass a layer of transversely extending stiffening members, the three layers being parallel to one another as viewed in cross-section of the loop, characterised in that the metal wires or cords are substantially inextensible, in that said loop is supported on longitudinally spaced pulleys operable to support the belting over its entire width, and in that there is means to hold the belting under longitudinal tension whereby to resist deflection of the belting between successive pulleys.

The tensioned longitudinal reinforcement reduces to a minimum any sagging between the longitudinally spaced rollers and thus avoids the need for the series of rollers along the sides of the belt. In addition the stiffening members spread out any point loads amongst all the longitudinal reinforcing members.

Preferably there are two cover layers of flexible elastomeric or plastics material one on the outer side of each of the layers of transverse stiffening members.

Preferably the transverse stiffening members extend at right angles to the length of the belt.

It is further preferred that the transverse stiffening members are held in position by means of longitudinal tie members.

A specific example of a conveyor belt according to the invention will now be described by way of example with reference to the accompanying drawings of which:—

Figure 1 shows a length of conveyor belting cut-away to reveal the reinforcement layers; and

Figure 2 shows diagrammatically a conveyor formed of the belting shown in Figure 1.

The belting comprises a carcass of longitudinally extending steel cords D embedded in the elastomeric material H. On either side of the carcass there is a layer C or F of transversely extending steel cords or wires spaced apart by tie wires B or E. The elastomeric material H may consist of a suitable polymeric composition which will provide a good bond

to both the longitudinal steel cords and the transverse stiffening members.

This polymer could be either a vulcanisable or a thermoplastic polymer, for example, natural rubber; styrene butadiene rubber; polychloroprene; nitrile; polybutadiene; polyurethane, polyvinyl chloride, ethylene vinyl acetate etc. Preferably the material will be a vulcanisable natural rubber, styrene butadiene rubber or a polychloroprene rubber, the latter being used where fire resistant properties are desirable.

The belting is provided with a back rubber cover A and a top cover G of suitable elastomer preferably divided with longitudinal grooves to accommodate a safety comb.

The covers A and G will normally be of an elastomeric composition with good ageing and abrasion properties. These again could be vulcanisable or thermoplastic polymers as described above, but would preferably be natural rubber, styrene butadiene rubber or polychloroprene; the latter giving good oil resistance and ageing properties, as well as fire resistance.

The transverse members C and F are preferably in the form of rods or wires as this helps to provide the necessary beam effect between the two layers of wires which provides the transverse rigidity in the belt. The transverse stiffening members could be metal slats. These members could also be rods or slats of non-metallic substances such as monofilament polyamides and polyesters, filament glass or rigid polyurethane. Zinc coated steel rods have been found particularly suitable. The wires or cords D and members C and F may be bonded to the carcass using isocyanate or other adhesion systems.

The steel cords D will be tensioned to assist the beam effect. The means for tensioning the steel cords D is shown in Figure 2, which illustrates the installation of the belting described above in a practical embodiment.

A conveyor belt 11, is looped round two end rollers 12 and 13. The axle of the roller 12 is rigidly fixed, and there is a driven motor 14 arranged to drive the conveyor through this roller. The axle of the roller 13 is constrained for sliding movement towards and away from the roller 12. There are tensioning devices 15 and 16 arranged to move the roller 13 away from the roller 12, to tension the belt 11 and hence the steel cords D. The devices 15 and 16 may be screw jacks.

The belt 11 may have the following specification: —

The belt has an endless length of 20 metres, is 104 cm. wide, and is 2.38 cm. thick. The belt is reinforced by 77 steel wires of 4.18 mm. diameter at a pitch of 13.2 mm, and the belt has a rating of 1000 kg./cm. width.

The drive and tail pulleys 12 and 13 are 50 cm. in diameter, and the snub rollers 17 and 18 are 40 cm. in diameter.

The recommended working tension is 46 kg/cm., and the rocommended power for a parallel conveyor is 15 H.P., and for a lift of 101/2 metres is 30 H.P.

By way of example the belt shown in Figure 2 may be subjected to a tension of 420 lb/inch (46 kg/cm.) applied by the jacks 15 and 16, and in this case a plurality of intermediate snub rollers (two of which are shown at 17 and 18) may be spaced apart along the belt at intervals of 4 feet (1.22 cm.). This spacing is determined by the expected loading on the belt and the acceptable amount of sag between rollers under load.

WHAT WE CLAIM IS: —

1. A conveyor consisting of an endless loop of conveyor belting, said loop consisting of a carcass of flexible resilient elastomeric or plastics material having embedded therein a layer of longitudinally extending metal wires or cords and on each face of the carcass a layer of transversely extending stiffening members, the three layers being parallel to one another as viewed in cross-section of the loop, characterised in that the metal wires or cords are substantially inextensible, in that said loop is supported on longitudinally spaced pulleys operable to support the belting over its entire width, and in that there is means to hold the belting under longitudinal tension whereby to resist deflection of the belting between successive pulleys.

2. Conveyor belting according to claim 1 characterised in that there are two cover layers of flexible elastomeric or plastics material one on the outer side of each of the layers of transverse stiffening members.

3. Conveyor belting according to claim 1 or claim 2 characterised in that the transverse stiffening members extend at right angles to the length of the belt.

4. Conveyor belting according to any one of the preceding claims characterised in that the transverse stiffening members are held in position by means of longitudinal tie members.

5. Conveyor belting substantially as hereinbefore described with reference to and as shown in Figure 1 of the accompanying drawings.

6. A conveyor substantially as hereinbefore described with reference to and as shown in Figure 2 of the accompanying drawings.

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1240123 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
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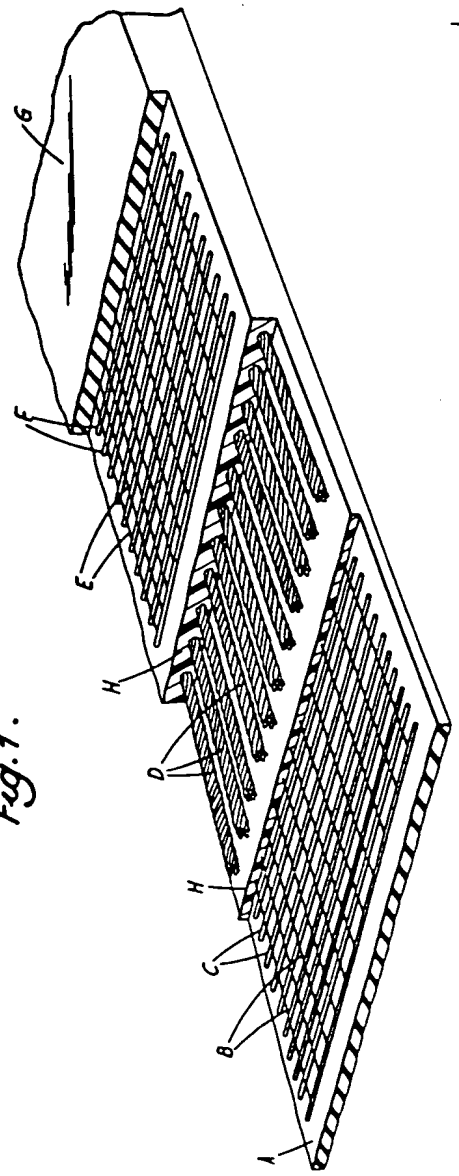

Fig. 1.

1240123 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

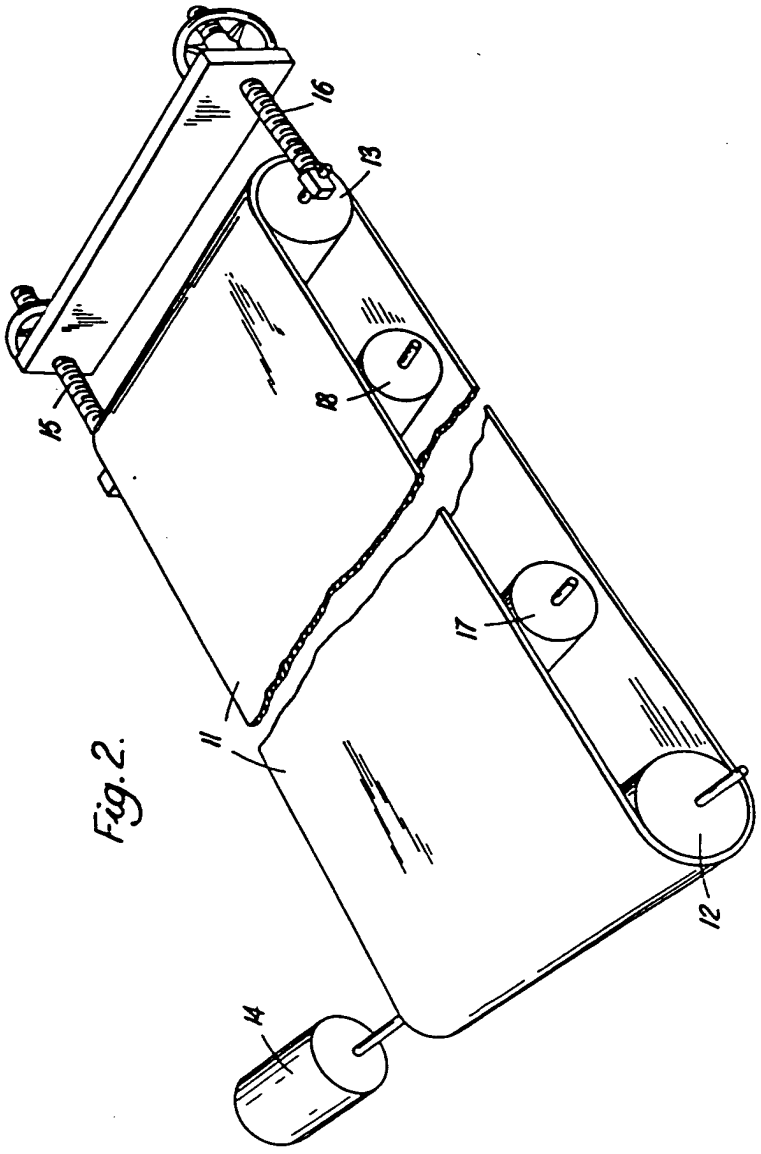

Fig. 2.